

Aerotech 4.1-5
Appl. No. 10/657,620
Response to Office Action dated September 14, 2004
Amdt. dated December 14, 2004

REMARKS

Upon entry of this Amendment, Claims 1 to 22 are pending in the application. Claims 1 to 19 have been rejected. Claims 20 to 22 are new. No claims have been allowed.

Independent Claim 1 has been amended to further define the rounded protrusion 32E as being located on the trailing edge 32D of the blade 32 of the fan 22. Support for this amendment is found in the specification on page 10, lines 11 to 25 and in Figures 2 and 3. Claim 1 has also been amended to further define the rounded protrusion 32E as being spaced apart from the hub 30. Support for this amendment is found in Figures 1 and 2. Finally, Claim 1 has been amended to eliminate the limitation of the inner cavity of the housing 12 having a circular cross-section. This limitation is believed to be unnecessary.

New independent Claim 20 is a combination of amended Claim 1 without the limitation of the rounded protrusion 32E spaced apart from the hub 30 and dependent Claim 2 as amended. Dependent Claim 2, as amended, calls for the width between the edges 32C and 32D of the blade 32 at the first end 32B to be less than a width of the blade 32 between the edges 32C and 32D at the second end 32A.

The German patent as discussed below does not show or suggest that the width of the blade at the end adjacent the hub is less than a width of the blade at the opposite end. In fact, the purpose of the blade of the German patent is to increase the work volume of the blades on the hub. Thus, the width of the blades at the hub is greater than the width of the blades at the opposite end. This configuration of the blades is shown in Figures 1 and 2 of the German patent.

New independent Claim 21 is similar to Claim 1 as amended without the limitation of the rounded protrusion 32E spaced apart from the hub 30. New Claim 21 calls for the rounded protrusion 32E to not extend inward toward the hub 30. Support for this amendment is found in Figures 1 and 2. The German patent, as discussed below, describes the nose-shaped portion 10 of the blade 6 as extending across the outer diameter of the hub 7 on the outflow side toward the impeller shaft and orientated inward across the outer diameter D_E of the inflow side A. New Claim 21 clearly calls for the rounded protrusion 32E of the blade 32 of Applicants' fan to not extend inward toward the hub 30. Thus, the structure of the blade 32 with the rounded protrusion 32E as set forth in new Claim 21 is clearly different from the structure of the blade 6 of the German

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patent with the nose-shaped portion 10 extending across the hub 7.

New Claim 22 is similar to amended Claim 1 without the limitation of the rounded protrusion 32E being spaced apart from the hub 30. New Claim 22 further defines the blades 28 as not extending outward beyond the first end 30A of the hub 30 toward the outlet 12B of the housing 12. Support for this amendment is found in Figures 1 and 2. The blade 6 of the axial fan of the German patent is structurally different from the blade 32 of Applicants' fan 10 as set forth in new Claim 22. The edge or side of the blade 6 of the German patent as shown in Figures 1, 2 and 3 clearly extends beyond the second disc 9 of the hub 7 toward the outflow side B of the fan.

In the Office Action

(1) Claims 1 to 16 were rejected under 35 USC § 103 as being unpatentable over German Patent DE 3425502 in view of Strawsine (U.S. Patent No. 3,472,150).

German Patent DE 3425502 discloses an axial fan for conveying cooling air in cooling towers and ribbed-tube radiators. The fan comprises a hub 7 having a first or hub disc 8 on the inflow side A and a second disc or outflow shell 9 on the outflow side B. The first disc 8

has a smaller diameter than the second disc 9. The blades 6 on their inflow sides have nose-shaped portions 10. The inwardly orientated nose-shaped portions 10 of the blades 6, extend across the outer diameter of the outflow shell 9 and point inward toward the impeller shaft. Due to the nose-shaped portions 10 of the blades 6, the work volume of the blades 6 is increased on the hub 7. This increased work volume in the accumulation area directly in front of the hub 7, achieves an increase in pressure on the blade outflow side and prevents a back flow leading to losses.

Strawsine describes an exhaust ventilator for mounting on a coach trailer. The ventilator includes an inner cylinder with a junction box on the lower portion and a damper on the upper portion. Figure 3 shows the fan blade 59 directly connected to the fan motor 58.

The invention defined by Claim 1 is structurally different from the axial fan of the German patent. As amended, Claim 1 calls for the rounded protrusion 32E of the blade 32 to be spaced apart from the hub 30. In contrast, in the German patent, the nose-shaped portion 10 of the blade 6 is directly adjacent the hub 7. The nose-shaped portion 10 of the blade 6 extends beyond the outer diameter of the hub 7 on the outflow side to the impeller shaft and is orientated inwards across the outer diameter

D_E of the inflow side A as shown in Figures 1 and 2. Furthermore, in order for the axial fan of the German patent to operate correctly, the nose-shaped portion 10 must be adjacent the hub 7 and extend across the outer diameter of the large disc 9 of the hub 7. The purpose of the nose-shaped portion 10 is to create an enlarged work volume in the accumulation area directly in front of the hub 7. Therefore, the nose-shaped portion 10 must be positioned directly adjacent the hub 7. In contrast, the rounded protrusion 32E of the blade 28 of Applicants' invention is not directly adjacent the hub 30. As set forth in amended independent Claim 1 and as shown in Figures 1 and 2, the rounded protrusion 32E is spaced apart from the hub 30.

In view of the above discussion, Applicants believe that amended independent Claim 1 is unobvious to one skilled in the art and patentable over the German patent in view of Strawsine. Further, dependent Claims 2 to 16, as depending from patentable base Claim 1, are unobvious to one skilled in the art and patentable over the above cited references. Reconsideration of this rejection is requested.

(2) Claims 17 and 19 were rejected under 35 USC § 103 as being unpatentable over German Patent No. 3425502

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in view of Strawsine (U.S. Patent No. 3,472,150) as applied to Claim 1 above and further in view of Bohanon, Sr. (U.S. Patent No. 4,445,426). The German reference and the Strawsine reference have been discussed in detail above and that discussion need not be repeated.

Bohanon, Sr. describes a housing structure for enclosing a fan assembly. The entrance to the housing is provided with a plurality of movable blades in a louvered shutter assembly.

Applicants believe that in view of the discussions in paragraph 1, with regard to independent Claim 1, dependent Claims 17 to 19, as depending from unobvious and patentable base Claim 1, are unobvious to one skilled in the art and patentable over the above cited references.

Furthermore, Bohanon, Sr. does not show or suggest a protrusion on the blade and thus, does not show or suggest spacing the protrusion apart from the hub of the fan. Reconsideration of this rejection is requested.

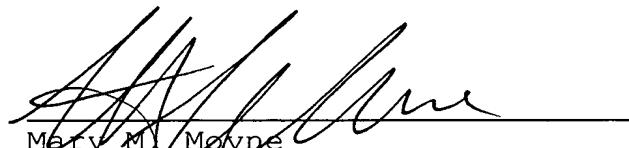
(3) Claims 1 to 19 were rejected under the judicially created doctrine of obviousness-type double patenting over Claims 1 to 31 of U.S. Patent No. 6,386,828. Enclosed is a Terminal Disclaimer in order to avoid the 35 U.S.C. 102(e)/35 U.S.C. 103 double patenting rejection. It

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is believed that this overcomes the rejection.

Applicants believe that Claims 1 to 22 are now in condition for allowance. Notice of Allowance is requested.

Respectfully,



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Attachments: Replacement Drawing Sheet
Annotated Drawing Sheet Showing Change
Terminal Disclaimer

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AMENDMENTS TO THE DRAWINGS

The attached drawing sheet includes changes to Figure 2. The position of the blade 32 has been changed to correctly show that the leading edge 32C of the blade 32 is adjacent the second end 30B of the center hub 30 and the trailing edge 32D of the blade 32 is adjacent the first end 30A of the center hub 30. Support for this amendment is found in the specification on page 10, lines 1 to 5 and in Figure 1. This sheet, which includes only Figure 2, replaces the original sheet having only Figure 2.

